Translation

PCT/EP2003/01445

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference AMG152WO	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/EP2003/014454	International filing date (*day/month/year*) 18 December 2003 (18.12.2003)	Priority date (*day/month/year*) 19 December 2002 (19.12.2002)
International Patent Classification (IPC) or national classification and IPC C08G 12/42		
Applicant AMI - AGROLINZ MELAMINE INTERNATIONAL GMBH		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a. ☐ *(sent to the applicant and to the International Bureau)* a total of _____ sheets, as follows:

☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- ☒ Box No. I Basis of the report
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
15 June 2004 (15.06.2004)	26 October 2004 (26.10.2004)
Name and mailing address of the IPEA/EP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2003/014454

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is language of a translation furnished for the purpose of:

☐ international search (under Rules 12.3 and 23.1(b))

☐ publication of the international application (under Rule 12.4)

☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ The international application as originally filed/furnished

☒ the description:

pages 1-26, as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

pages 1-24, as originally filed/furnished

pages* _____, as amended (together with any statement) under Article 19

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ the drawings:

pages _____, as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-24	YES
	Claims		NO
Inventive step (IS)	Claims	1-24	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-24	YES
	Claims		NO

2. Citations and explanations

This report makes reference to the following document:

D1: WO 02/40564 A (BOERNER FRANK; RAFLER GERALD (DE); BONATZ ECKHARD (DE); FRAUNHOFER), 23 May 2002 (2002-05-23)

1. The present application relates to:
   (i) a direct synthesis process for producing etherified melamine resin condensates (cf. claims 1-22),
   (ii) the use of etherified melamine resin condensates produced by the claimed direct synthesis process (cf. claim 23), and
   (iii) melamine resin products produced from a melamine resin condensate etherified by a direct synthesis process (claim 23).

2. D1 describes a triazine resin precondensate as a product-by-process obtained by reacting melamine with an aldehyde and by subsequently etherifying the resultant triazine-aldehyde resin with alcohols. In a first process stage, the triazine derivative is methylolated with C_1-C_{12} aldehydes and only in a second stage the thus hydroxymethylated triazine

derivatives are etherified with C_1-C_{12} alcohols.

The claimed process is characterised in that in the first reaction stage an etherified triazine derivative, preferably an etherified melamine, is produced in an alcoholic solution, i.e. methylolation and etherification run in parallel. The resultant etherified melamine resin precondensate is concentrated at the same time as high-molecular alcohols, diols or tetravalent alcohols are added. In the subsequent, second reaction stage, transesterification is carried out in a kneader.

A person skilled in the art therefore could not derive from the citation the claimed process for producing etherified melamine resin condensates characterised by parallel methylolation and etherification, followed by transetherification with high-molecular alcohols.

The subject matter of claim 1 is therefore novel over the prior art (PCT Article 33(2)). Dependent claims 2-22 and subsidiary claims 23 and 24 should also be considered novel.

3. D1 describes a process having a first stage during which the triazine derivative is methylolated in a basic medium and the thus hydroxymethylated triazine derivatives are then etherified in an acid medium (pH 4.0, example 1) only in a second step.

According to example 1, the resin is stabilised by neutralisation with KOH after etherification and before precuring. In order to separate the salt

formed during neutralisation, the resin is first concentrated in that MeOH and H_2O are eliminated by distillation. Butanol is then added as filtration medium and the salt is separated, due to its insolubility in butanol. Butanol is thus not a reaction partner because no transetherification takes place. The resultant resins are only partially etherified and still contain $-NH-CH_2-O-CH_2-NH-$ groups. These groups are not totally but only partially removed by the final precuring process at 160 to 200°C (D1, page 5, paragraph 4).

The problem addressed by the claimed process, however, consists precisely in producing a resin which is free from $-NH-CH_2-O-CH_2-NH-$ groups which link the triazine rings (page 1, lines 29-35, of the application), and which presents superior extensibility.

A person skilled in the art knows that $-NH-CH_2-O-CH_2-NH-$ groups are unstable and react easily, releasing formaldehyde from the resins. The release of formaldehyde leads to the formation of micro-cracks (page 1, lines 20-28, of the application) in the resultant products, and is furthermore harmful to health.

The problem addressed is solved by the claimed multi-stage process. The simultaneous or gradual reaction of melamine and formaldehyde in an alcoholic solution during the first reaction stage, followed by concentration and transetherification with higher-molecular alcohols in the second reaction stage in a kneader, eliminates any $-NH-CH_2-O-CH_2-NH-$ groups which link the triazine

rings (cf. examples 1-4). The elongation of the claimed resins amounts to 3.1% (D1, page 25, example 6), while the elongation of the resins produced according to D1 ranges from 1.3 to 2.2% (D1, pages 8-9; examples 3 and 4).

The invention thus involves an inventive step (PCT Article 33(3)).

4. The present application appears to meet the requirements of PCT Article 33(4) because the subject matter of claims 1-24 is industrially applicable.